DOCUMENT RESUME

ED 134 548 SP 010 722

AUTHOR	Armstrong, David G.; Pinney, Robert H.
TITLE	Record Keeping for Individualized Instructional Programs. Professional Studies Series.
SPONS AGENCY	National Education Association, Washington, D.C.
PUB DATE	77
NOTE	71p.
AVAILABLE FROM	National Education Association, 1201 Sixteenth St., N.W., Washington, D.C. 20036 (Stock No. 1601-7-00)
EDRS PRICE	MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS	*Academic Records; Comprehensive Programs; Educational Objectives; *Individualized Instruction; Information Processing; Program Development; Program Effectiveness; *Recordkeeping; *Records (Forms)
IDENTIFIERS	*Student Control

ABSTRACT

One practical consideration in the implementation of individualized instruction is the development of a record keeping system. It should reflect the characteristics of the instructional system it serves by (1) tracking the progress of the learner through stated objectives; (2) providing diagnostic data of proficiencies and deficiencies; (3) preserving a record of learning activity selection processes; and (4) storing evaluations of instructional effectiveness. A basic record keeping system focuses on the first two requirements and should reveal the expected outcomes of an instruction and the actual results of the instruction. A system of record keeping for program objectives may be developed relating goals to the objectives supporting them, or to learning materials, or to learning tasks. Appropriate evaluation forms should be reflective of the system chosen for recording objectives. More comprehensive systems of record keeping focus on data gathering, storage, and interpretation as means for promoting confident change in the instructional sequence. They should record information on degrees of understanding, ability, and learner preference in relation to the activities involved. An additional benefit of comprehensive record keeping may result by developing learner-kept records, enabling the learner to develop a sense of self-development and progress. No standard record keeping systems exist applicable to all individualized instruction settings; therefore, the "goodness" of a system is contextual: does it validate its worth in relation to the demands of the system? (MB)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

PERMISSION TO REPRODUCE THIS COPYRIGHTED MATERIAL BY MICROFICHE ONLY HAS BEEN GRANTED BY
NEA
TO ERIC AND ORGANIZATIONS OPERATING UNDER AGREEMENTS WITH THE NATIONAL INSTITUTE OF EDUCATION. FURTHER REPRODUCTION OUTSIDE THE ERIC SYSTEM REQUIRES PERMISSION OF THE COPYRIGHT OWNER.

400 pages
7.25 cloth

SP

ED134548

Record Keeping For Individualized Instructional Programs

nea

Professional Studies

A National Education Association Publication

by
David G. Armstrong
and
Robert H. Pinney

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

SP010722

Record Keeping For Individualized Instructional Programs

by
David G. Armstrong
and
Robert H. Pinney

National Education Association
Washington, D.C.

Copyright © 1977
National Education Association of the United States

Stock No. 1601-7-00 (paper)
1609-2-00 (cloth)

Note

The opinions expressed in this publication should not be construed as representing the policy or position of the National Education Association. Materials published as part of the NEA Professional Studies Series are intended to be discussion documents for teachers who are concerned with specialized interests of the profession.

Library of Congress Cataloging in Publication Data

Armstrong, David G.
Record keeping for individualized instructional programs.

(Professional studies)
Bibliography: p.
1. Individualized instruction. 2. Grading and marking (Students) I. Pinney, Robert H., joint author. II. Title. III. Series.
LB1031.A75 371.39'4 76-44331
ISBN 0-8106-1609-2
0-8106-1601-7 pbk.

CONTENTS

WHY KEEP RECORDS? 7

A MODEL OF INSTRUCTION FOR RECORD KEEPING 10

- Stating Objectives 10
- Diagnosing Learner Needs 10
- Selecting Learning Activities 12
- Evaluating Instructional Effectiveness 12

A BASIC RECORD-KEEPING SYSTEM 13

- Stating Objectives 14
- Evaluating Instructional Effectiveness 20

A MORE COMPREHENSIVE RECORD-KEEPING SYSTEM 28

- Diagnostic Information 32
- Prescription Information 34
- Building a Comprehensive Record-Keeping System 35

PUTTING THE SYSTEM TO WORK 45

- Knowledge 46
- Skills 46
- Hoped-for Attitudes 46
- Building Learner Commitment to Individualized Instructional Programs through Record Keeping 48
- Security of Data 59
- In Defense of Learner-Kept Records 59
- Conclusion 59

BIBLIOGRAPHY 63

- Articles 63
- Books 63
- Monographs 64

WHY KEEP RECORDS?

We educators live in a world that prescribes more of our individual opinions about teaching than we like to admit. In recurring cycles, ideas pulse across the land engaging us in professional commitment that runs so deep that we recall with difficulty a time when this commitment was not there. One of these innovative waves has brought to light a nearly universal belief that instruction ought to be individualized.

For many, the commitment to individualized instruction has remained at a symbolic rather than at an operational level. This situation reflects our history as a profession that is more comfortable with educational theory than with educational engineering. For every convention speaker who has provided us with practical guidelines for implementing individualized instruction, we all can recall ten others who provided us with no more than a well-argued case for an emotional commitment to individualization of instruction.

Our aim is to help bridge the gap between individualized instruction as an appealing idea and individualized instruction as a vital, functioning, practical classroom program. More specifically, we want to focus on record keeping in individualized instructional programs. We believe the failure to have a system for keeping track of who is doing what and has done what has led many teachers to conclude that individualization of instruction is a nice idea but not really very practical. We hope that some of the procedures suggested here will make it possible for any teacher to manage an individualized program, keep adequate records, and not work a 26-hour day!

Before we can begin keeping records, we have to make some decisions about what individualization of instruction is. Many of us often conjure up nightmare visions of "autonomous" learners engaging in a near riot in our classrooms during the visit of a parent who is only marginally supportive of our efforts. While we do not wish to be overly sanguine about the problems of learner control in individualized programs (as in traditional classrooms there are memorable days and days that are eminently forgettable), we do wish to lay to rest the myth that individualized learning and independent learning are equivalent terms.

Individualized learning involves a conscious attempt to match the learning experiences provided for an individual student to his or her unique blend of personality, learning style, and present level of accomplishment. For some students, careful assessment of personality variables and learning preferences may indeed result in a decision to provide opportunities to engage in carefully planned independent learning activities. For many others, such a prescription could spell disaster. (Have you ever been confronted by an angry colleague with one of your students in tow who was caught banging hall lockers or making some other disturbance during an unauthorized room absence? After such incidents faculties have been known to rise up in mass protest against individualized instructional programs.)

If there is a single key ingredient to success in managing individualized instructional programs, that ingredient is planning. In the absence of careful, systematic planning we cannot hope to make rational decisions concerning who will profit from which learning experience. It is essential to work within a plan that has a broad enough scope to provide information for making a wide variety of decisions. Without a built-in ability to make sound instructional decisions, programs directed toward the individualization of instruction have little chance of success.

A plan should provide information that will promote sound decision making in each of the following six areas:

1. Division of subject matter into manageable learning segments
2. Identification of diagnostic procedures
3. Preparation of learning task options
4. Establishment of appropriate levels of task performance
5. Development of subject matter tests
6. Identification of procedures for reporting the learner's progress.

Decisions concerning each of these areas can be made with confidence only when records are available that enable us to analyze each student's progress as well as the appropriateness of the learning experiences we have made available to each. The quality of these decisions is directly related to the quantity and character of the information at hand. We hope to assist you in your effort to gather useful and important information by presenting (1) a framework for record keeping, (2) specific examples of possible information storing formats, and (3) practical trouble-shooting procedures to help you set up and maintain your own record-keeping system.

Before outlining our general approach, we would like to digress for a moment with a short anecdote:

> Herbert has a compulsion. And it costs him money . . . lots of money. Two weeks ago he invested $5,800 in a deep-sea diving outfit complete with a font lens ground to correct his congenital myopia. Yesterday morning, he wrote a check for $4,200 dollars and took delivery of a special edition of *War and Peace*, 16 inches thick, bound in India rubber, and printed with water resistant ink on a special DuPont plastic.
>
> Yesterday afternoon, Herbert donned his diving apparatus, took his book, and chartered a barge to deliver him to the center of the Santa Barbara channel. Promptly at two o'clock, with book in hand and hooked to the life support systems, Herbert was lifted over the side and dropped to the bottom. Two hours passed. Three hours. Finally, a jerk came on the line, and Herbert was hauled dripping to the surface.
>
> Some minutes later, stripped of his diving paraphernalia, Herbert began to talk. "Know why I do it?" he asked no one in particular.
>
> "No, why?" someone ventured.
>
> "Because," Herbert averred, "I like a quiet place to read."

Herbert's behavior illustrates a problem faced by all of us as we become involved in developing systems for record keeping in individualized instruction. Occasionally we have to pull back from what we are doing to ask: Is the end result of this paperwork really worth the trouble? If the answer to that question is anything other than yes, our procedures are deficient and we are inappropriately serving a record-keeping system rather than an instructional system. It is essential that the record-keeping system serve some larger end than record keeping itself. If it does not, it robs valuable time that could more justifiably be spent elsewhere.

How much record keeping is essential? At bottom, this question has to be answered by each teacher in light of conditions in his or her own classroom. Our general personal bias is to start simply and add refinements only as the need arises. We feel that there is a need to achieve an equilibrium between our desire to have as much information as possible available and our desire not to spend all our time keeping records.

To meet the interests of those who wish to begin with the basics, as well as those who wish to add refinements, we have decided to describe our suggested record-keeping procedures in terms of (a) a basic record-keeping system and (b) a more comprehensive record-keeping system. A basic record-keeping system will provide an adequate set of records that can serve as a basis for responsible decision making. We include in the more comprehensive system examples of the sorts of additional information that might be useful to those who seek to expand and refine their systems.

We have described elements of record-keeping systems, primarily, both for evaluating learners and for assessing the impact of various parts of the instructional program. It is our conviction that program revision that is systematic demands information not only concerning learners' progress but also information focusing on the effectiveness of specific features of the learning program. With records concerning both learners and program, we are in a position to make grounded decisions about prescriptions for individual learners and about the appropriateness of the alternative learning options we have identified. Your program, and not its record-keeping scheme, is the real priority. As you read on, hopefully you will find several helpful ideas.

A MODEL OF INSTRUCTION FOR RECORD KEEPING

The best record-keeping system is one that reflects the characteristics of the instructional system it serves. It is not imposed but is rather a part of that instructional program.

Although the specific design of each instructional program is unique, we would like to suggest for consideration a widely used model for an effective program. This model is characterized by the key functions in the process of instruction as shown in Figure 1.

Often characterized as goal-based, a model such as illustrated in Figure 1 implies that instruction is best approached systematically. Our model assumes that the fundamental purpose of instruction is to increase the efficiency with which our students achieve stated program objectives. The model further assumes that the best instructional decisions are those made on the basis of information we have concerning each of the four functions. Guidance by a model of this type promotes the systematic design, implementation, and continuous review of instructional practices.

We believe that a record-keeping system must support successful use of an instructional process such as that implied by the model we have presented here in Figure 1. The next two chapters will introduce procedures for developing a record-keeping system that will support an instructional system designed with this model as a framework.

Before we jump into an extensive description of record-keeping procedures derived from and supporting the model in Figure 1, let us briefly describe each of the four instructional functions included in the model.

Stating Objectives

Curriculum can be defined in terms of *hoped-for effects* or *objectives.* Objectives specify the evidence we will accept that learning has taken place. Nearly all decisions we make will be in some way or another related to our objectives. A number of possibilities for developing record-keeping procedures to keep track of information concerning our stated objectives will be discussed in the third chapter, "A Basic Record-Keeping System." In general, these record-keeping systems will enable us to maintain a cumulative record of each learner's progress according to the given course or curriculum objectives.

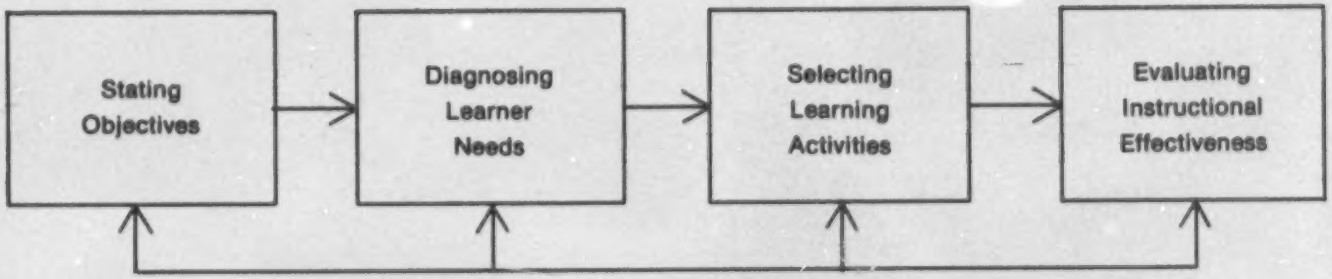
Diagnosing Learner Needs

Diagnosing learner needs is important to instruction in that it helps us to determine which students have already mastered certain objectives, which students lack necessary prerequisite skills and knowledge, and which learning materials and activities are most appropriate for which students.

Diagnosis helps us to optimize the *fit* between a given learning activity and the needs and interests of individual learners. Diagnosis provides information that makes it possible for us to design instructional programs that become increasingly more efficient, humane, and personalized. Procedures for diagnostic data gathering and record keeping as they relate both to individual students and to instructional programs themselves will be outlined in the fourth chapter, "A More Comprehensive Record-Keeping System."

Figure 1

A Model of Instruction



Selecting Learning Activities

Selecting learning activities takes place after the fit between objectives and individual student needs and interests has been determined. When we have clear and appropriate objectives as well as sufficient diagnostic data in hand, we are in a position to deal with such questions as: What learning activities should be presented? How should learning activities be presented? In what order should learning activities be presented? Under what circumstances should learning activities be presented?

Clearly, the amount of selecting we can do is limited by the available alternatives. Who does the selecting will be influenced by the type of instructional program in operation. The number of selection options available, the frequency with which available options are in fact selected, and the question of who does the actual selection all have substantial implications for record keeping. These issues will be addressed in the fourth chapter.

Evaluating Instructional Effectiveness

When our students complete a given segment of instruction (topic, unit, etc.), we assess their performance to determine whether the implemented instructional plan has resulted in mastery of our stated objectives. This evaluation process typically involves us in the use of various procedures designed to provide information about changes in students' knowledge, skills, and attitudes.

If we find that students have had trouble with some of the stated objectives, one or more of the following reasons might have been the cause of the difficulty:

1. The objectives were unrealistic for those students.
2. Those students were not adequately motivated.
3. The instructional activities, sequence, or materials were inappropriate for those students.

Procedures for recording information concerning evaluation of instructional effectiveness will be described in the next chapter, "A Basic Record-Keeping System."

The features and complexities of a record-keeping system can be determined only after we have decided upon the specific instructional program that the record-keeping system will support. We have suggested a four-function model of instruction that represents one possibility for describing and assessing the dimensions of the instructional program with clarity. Whether others choose to use this model or another schema is unimportant. What is essential is a clearly conceptualized view of instruction that can guide our analysis. Only when we have a clear view of the components of the instructional process are we in a position to develop a record-keeping system that will give us highly useful information at minimal costs to our energies, time, and capital resources.

A BASIC RECORD-KEEPING SYSTEM

Stating objectives and *evaluating instructional effectiveness* represent the key elements of the instructional model introduced in the preceding chapter. The other two functions of the model, *diagnosing learner needs* and *selecting learning activities*, relate to processes of day-to-day decision making that most appropriately are guided by our predetermined instructional objectives and evaluation procedures. A precisely defined set of objectives and evaluation procedures permits us to go about the business of diagnosing learner needs and selecting learning activities with the conviction that we know where our program is headed.

Objectives and evaluation procedures necessarily are interdependent. When objectives are not accompanied by a parallel array of evaluation procedures, those objectives have little value as guides for instruction. If we wish our students to learn something that we express as an objective, then we must expend some effort to develop a means for determining how well our program facilitates mastery of that objective. Failure to provide for evaluation of learner progress toward mastery of our objectives is an abandonment of professional responsibility.

Similarly, evaluation that has any meaning must be related to objectives. Evaluation that is not connected to objectives is, first of all, a questionable use of time in that it cannot provide information for revision of the instructional practices developed to achieve those objectives. Secondly, such evaluation is a questionable procedure from an ethical standpoint. It is hardly fair to evaluate students except on the basis of what they have learned from instructional experiences to which they have been exposed. A week's work on the *passé simple* in French verbs cannot be followed defensibly by a test over the *perfective aspect* in Russian verbs.

The hand-in-hand relationship of objectives and evaluation has implications for record keeping. Records relating to objectives must be kept in such a way that they are useful for evaluation. Similarly, record-keeping procedures that focus on the evaluation component of the instructional model must be keyed to objectives. If this logical relationship is kept clear, then the record-keeping system will provide a useful base of evidence upon which meaningful instructional decisions can be made, and with increasing confidence.

Record-keeping procedures that involve gathering information about objectives and evaluation constitute what we call the basic record-keeping system. The basic record-keeping system yields information enabling us to deal adequately with two of the most fundamental questions we educators are asked to face:

1. What should our learners have accomplished as a result of instruction?
2. What, in fact, did our learners accomplish as a result of instruction?

We may well want to answer additional questions, especially those that deal with our decisions about the day-to-day instructional program and the unique characteristics of individual learners. Procedures for extending the basic record-keeping system allowing for a more sophisticated analysis will be introduced in the next chapter, "A More Comprehensive Record-Keeping System."

As a beginning, we might start by gathering information concerned only with objectives and evaluation. Indeed, techniques for collecting these basic data must be mastered before a more comprehensive record-keeping system can profitably be attempted. Comprehensive record-keeping systems are simply extensions and refinements of the basic reservoir of procedures that can be broadened later to meet more specific individual teacher needs.

Stating Objectives

We hope that curriculum guides will be available to users of this book. A record-keeping system cannot be built in the absence of some sort of broad programmatic framework that provides general guidelines relating to scope and sequence. If we wish to individualize a program for which a general curriculum framework is lacking, we must delay our planning for individualization until we, ourselves, develop a functional program guide. Several outstanding books provide clear directions as to how to proceed with such an undertaking. (See, for example: Doll, Ronald C. *Curriculum Improvement: Decision-Making and Process.* Boston, Massachusetts: Allyn and Bacon, Inc., 1967; Oliver, Albert I. *Curriculum Improvement: A Guide to Problems, Principles, and Procedures.* New York, New York: Dodd, Mead & Co., 1965; Tyler, Ralph W. *Basic Principles of Curriculum and Instruction.* Chicago, Illinois: University of Chicago Press, 1949.)

Record keeping, as it concerns objectives, begins with an identification of course goals. These may be taken directly from district curriculum guides or from guides we develop ourselves. In establishing procedures for collecting information about objectives, we need to identify relationships between individual objectives and subject area goals as set forth in the curriculum guide.

Program objectives must be consistent with curriculum goals. This consistency must be reflected in the scope and sequence of the learning experiences suggested by and derived from these objectives. A good record-keeping system reflects the relationships among course goals, objectives, and learning experiences derived from the objectives.

A rudimentary record-keeping system for program objectives might involve nothing more sophisticated than a breakdown of some general course goals from a curriculum guide into instructional objectives. Figure 2 illustrates this in schematic form.

The instructional objectives included in Figure 2 represent a considerable move in the direction of increased specificity. They begin to operationalize the general goal statement. The specificity of each objective could be increased by the inclusion of a criterion level, a performance standard, that learners would have to achieve in order to be credited with mastery of the objective. Since the actual criterion level may well differ from teaching situation to teaching situation, Figure 2 doesn't include any criterion level with the objectives in the sample record keeping form.

While the objectives stated in Figure 2 represent a refinement of the original goal statement, they still do not provide all the information we might wish to have. For example: Are some objectives more difficult than others? What learning tasks might a learner accomplish to master each objective? How many of these learning tasks should there be for each objective?

The potential for increasing the sophistication of record-keeping instruments focusing on program objectives is enormous. The only limits are the decisions we make concerning the sorts of information we deem most useful. Among the possible information we might wish to possess are details concerning the relative difficulty of each objective and the sequence in which these objectives seem to be best mastered. In recording such information, we might begin by assigning a letter "A" to the least demanding objective and continue assigning additional letters of the alphabet to other objectives in the order of their difficulty. Figure 3 represents an illustration of such a procedure.

Figure 2

Instructional Objectives Supporting a Given Curriculum Goal

Goal I: The learner will come to appreciate the free exchange system as represented in our securities markets.					
objective	objective	objective	objective	objective	objective
The learner will identify accurately selected securities market terminology.	The learner will differentiate between puts and calls and will describe possible advantages to writers of both puts and calls.	The learner will describe in outline form key events in the history either of the New York Stock Exchange or of the American Stock Exchange.	The learner will distinguish between common stock and preferred stock.	The learner will point out the reasons companies issue bonds and debentures.	The learner will describe the operation of warrants and stock options.

Note that the objectives in Figure 3 are identical to those in Figure 2 except that they have been labeled and rearranged in terms of increasing levels of difficulty. An analysis of Figure 3 suggests that we would expect learners to first master objective "A," next tackle "B," and continue on in a like manner until they arrive at the most difficult, objective "F."

Having established levels of difficulty and the best sequence, we now can further refine the program objectives component of our record-keeping system. We might be interested, for example, in keying specific learning materials to each objective. In considering this refinement, we might decide that it would be useful to group learning materials under two broad headings: (1) overview, and (2) enrichment. *Overview* materials could include all the critical information and experiences a learner would need in order to master a given objective. *Enrichment* materials would serve to broaden these basic understandings through review and more comprehensive treatments designed to provide both breadth and depth. Figure 4 illustrates a record-keeping form that ties both overview and enrichment materials to specific objectives. The same objectives are used in Figure 4 as in Figure 3, but in this instance the objectives are referred to by letter only.

Figure 4 could be modified slightly to reflect the difficulty level of the identified materials. For example, brown ink might denote items of low difficulty, blue ink might indicate items of intermediate difficulty, and green ink might signal materials of high difficulty. In Figure 4, for example, "A" and "B" materials might be written in brown, "C" and "D" materials in blue, and "E" and "F" materials in green. A simpler schema might require only a two-color coding of materials on the basis of their being either easy or difficult. Indeed, we may not wish to use colors at all. Certainly many other symbol systems could be devised to replace color as a way of portraying distinctions among difficulty levels. (A,B,C; X,Y,Z; +,✓,-; 1,2,3; etc.)

A final refinement we might wish to consider focuses not on the materials the learners will use but rather on specific tasks for each learner. These tasks can be tied numerically to our program objectives. Figure 5 illustrates such a procedure.

The number of tasks selected for illustration in Figure 5, of course, was arbitrary. For some objectives, we might wish a large number of learning tasks. For other less challenging objectives, a single learning task might well suffice. The number of learning tasks listed for each objective depends entirely on our perception of the difficulty of a given objective and the characteristics of the learners with whom we are working.

After we decide how many tasks are appropriate, we may also wish to identify each task according to its importance. Possibly there will be some tasks that are desirable for all learners to accomplish. Other tasks may be included to provide opportunities for selected youngsters to undertake enrichment activities. In order to portray this distinction visually, we might use red ink to indicate all the *must-do* tasks and green ink to indicate *supplementary* tasks.

It is possible, too, that some tasks must be done before others. If our program involves a specific sequence of tasks, that sequence can be indicated by a color coding system keyed to a set of rules such as the following:

RULES

1. Do all tasks in red ink first.
2. Do all tasks in green ink before doing any tasks in blue ink.
3. Do all tasks in blue ink before doing any tasks in brown ink.

Figure 3

Instructional Objectives, Ordered in Terms of Difficulty, Supporting a Given Curriculum Goal

Goal I: The learner will come to appreciate the free exchange system as represented in our securities markets.					
Objective A	Objective B	Objective C	Objective D	Objective E	Objective F
The learner will identify accurately selected securities market terminology.	The learner will describe in outline form key events in the history either of the New York Stock Exchange or of the American Stock Exchange.	The learner will distinguish between common stock and preferred stock.	The learner will point out the reasons companies issue bonds and debentures.	The learner will describe the operation of warrants and stock options.	The learner will differentiate between puts and calls and will describe possible advantages to writers of both put and call options.

Figure 4

Learning Materials for Overview and
Enrichment Keyed to Specific Learning Objectives

Goal I: The learner will come to appreciate the free exchange system as represented in our securities markets.	Objectives			
		F	enrichment	Buus: *Successful Option Trading; Journal of Commerce* (selected issues)
			overview	Steig: *Let's Trade*, pp. 10-25 *Wall Street Journal* 6/7/71 (p. 5)
		E	enrichment	Ward: *Millions for Sense;* Twouhy: *Dollars "On the Cheap"; Wall Street Journal* (selections)
			overview	Smith: *The How's of Warrants*, pp. 15-48 Pauly: *Optioneering*, pp. 4-23
		D	enrichment	*Moody's Bond Survey* (selections) Baron's (selected issues) Feigle: Capital Generation (Ch. 5)
			overview	Craig: *How Industry Builds Itself*, pp. 54-73
		C	enrichment	Ilg: *Preferred Profits through Preferred Stocks* Lyons: *Common is King* (Ch. 7)
			overview	Bolch and Smith Co. pamphlet: "Common is to be Preferred!"
		B	enrichment	Jones: *Swindlers, Swingers, and Swags - 30 Years on the Street* (Ch.8)
			overview	Biggs: *Under the Buttonwood Tree*, pp. 18-69 Powell: *The Tinsel Merchants* (Ch. 1)
		A	enrichment	*Wall Street Journal*, 7/7/74, p. 7 *Curbing the Bears is no Bull*
			overview	Smith: *A Student Views the Street* (all) Pearce: *Commerce Canyons* (Ch. 9)

Figure 5

Learning Tasks Keyed to Specific Learning Objectives

Goal I: The learner will come to appreciate the free exchange system as represented in our securities markets.	Objectives			
	A	task A1	See *Wall Street Journal* microfilms for 6/7/69 (page 6). Oral report to teacher will include origins of terms "bull," "bear," "curb."
		task A2	Read Smith, pp. 6-31. Pass criterion test with 80% accuracy.
	B	task B1	Prepare a time line chart from 1800 to present using critical events from Powell, Chapter 1.
		task B2	Interview a broker concerning protection of investors now as compared to 1800's. Write up interview using *U.S. News & World Report* format.
	C	task C1	You head a corporation. Prepare a written response to a shareholder's question about why your company issues preferred stock.
		task C2	Prepare a chart listing features of common stock and preferred stock.
	D	task D1	Read Craig, pp. 59-73. Pass quiz over fundamentals of bonds and debentures with 80% accuracy as a minimum.
		task D2	Using data to support your conclusions, prepare a written report to a Board of Directors suggesting ways to raise $150,000,000.
	E	task E1	Prepare a bibliography of at least twenty-five entries indicating where one can find information about warrants and stock options.
		task E2	Read Smith, pp. 15-48 or Pauly, pp. 4-23. Pass quiz on warrants/stock options with 80% accuracy or better.
	F	task F1	Prepare a chart illustrating differences between a "put" and a "call."
		task F2	You own 100 shares of a company. Under what conditions would you consider (a) writing a "put" option, (b) writing a "call" option?

The record-keeping forms and procedures we have suggested here represent only a sampling of the possible record-keeping devices we might generate to help us focus on our program objectives. In deciding what sorts of information to include, we need to identify our own priorities with some measure of precision. If we spend time with forms that include either more data than we need or data of a different type than we need, we risk taking valuable time away from more clearly essential instructional tasks. On the other hand, if the system is general and broad, we may well find ourselves with information that is so sketchy that it provides no sound basis for revision of our instructional program.

Determining how much and what sorts of data are right for our own teaching situation is a personal decision we each must make in the light of our individual circumstances. In a general sense, a useful basic record-keeping device is one that provides information that will support a serious evaluation of our instructional program. If this criterion is met, the possible varieties of the basic record-keeping systems are many, and each can be generated in response to our own needs and preferences.

The organization, display, and coding of information relating to objectives comprises only one part of a basic record-keeping system. The complete basic system, in addition to procedures for organizing data concerning objectives, includes a parallel set of procedures focusing on the whole area of evaluation. We need evaluation information so that we can move beyond talking about our objectives as abstractions to talking about them in terms of how well they were mastered by youngsters in our classrooms. A number of possibilities for putting together information concerning objectives and learner performance are suggested in the next section.

Evaluating Instructional Effectiveness

Two major tines stand out on the fork of evaluation in individualized instruction. On the one hand, we need information to show us how learners are progressing through our program. On the other hand, we need information to establish a meaningful basis for making decisions that lead to program revision and modification. Both needs can be met with one collection of information provided that a carefully designed system is employed to record learner-progress information.

In terms of their format, learner progress records are merely extensions of our program-objectives collection records as introduced in the previous section. When deciding which program-objectives form to use as the basis for our evaluation record (see Figures 2, 3, 4, 5), we must first decide how much and what kind of information we want to have available for review and will have time to review. To illustrate the information-carrying capabilities of alternative forms, we will discuss evaluation records that have been derived from each of the program-objectives forms introduced earlier.

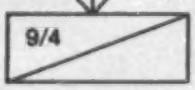
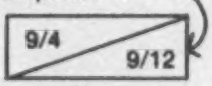
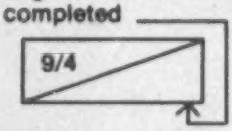
The format depicted in Figure 6, for example, represents a simple extension of the model displayed in Figure 2 introduced in the program objectives section of this chapter. In Figure 6 note the addition of a class roster, a notation system, and spaces to indicate each student's progress on each objective.

What sorts of questions can we answer using the information recorded on Figure 6? Among the possibilities are the following:

1. Which learners completed which objectives?
2. Which learners began, but did not complete, certain objectives?

Figure 6

A Learner Progress Record Developed from Figure 2

Goal I: The learner will come to appreciate the free exchange system as represented in our securities markets.						
KEY work on objective begun  work on objective completed  work on objective begun, but not completed  	Objective The learner will describe the operation of warrants and stock options.	Objective The learner will point out the reasons companies issue bonds and debentures.	Objective The learner will distinguish between common stock and preferred stock.	Objective The learner will describe in outline form key events in the history either of the New York Stock Exchange or of the American Stock Exchange.	Objective The learner will differentiate between puts and calls and will describe possible advantages to writers of both puts and calls.	Objective The learner will identify accurately selected securities market terminology.
Abrams, A						
Bentz, B.						
Cole, C.						
Denny, D.						
Ender, E.						
Fogg, F.						
Gear, G.						
Howard, H.						
Islip, I.						
Jensen, J.						
Kent, K.						
Lewin, L.						

3. Which objectives were completed by the largest (or smallest) number?
4. Which objectives did learners tend to complete first? last?
5. Were there any objectives that a large number of learners started but failed to complete?
6. Did some learners have a pattern of starting work on, but not completing, nearly all objectives?
7. How long did individual learners work on given objectives?

These seven questions are just a sample of possible queries. Many more could be addressed and responded to by reference to the information recorded on the form displayed in Figure 6.

Perhaps more important than the questions that can be answered is the identification of questions that cannot be answered by reference to the recorded data. If there are too many unanswerable questions, then we will want to reject this form and find a form that is more directly suited to our own informational requirements.

For purposes of illustration, let's look at some questions that we cannot answer by referring to Figure 6.

1. What learning tasks were learners exposed to for each objective?
2. What criterion task was used to determine mastery of each objective?
3. What resource materials were available to learners for each objective?
4. Was there something inherently more difficult about some objectives than other objectives?

If we were particularly interested in developing a record that provides answers to some of these questions, we would have to look for a format that would yield more information than Figure 6.

A slight increase in usable information would be provided by building our learner-progress record according to the format depicted in Figure 7. Figure 7 is an extension of Figure 3, which was introduced in the program-objectives section. It will be recalled that objectives are ordered in terms of increasing difficulty from "A," the least challenging, to "F," the most difficult.

The data collected using Figure 7 can tell us something about the inherent difficulty of certain objectives and the success or lack of success of individual learners in mastering those objectives. We might also be able to discern a pattern that tells us that many students are succeeding in their attempt to master most of the easier objectives but are being frustrated when called upon to deal with some of the more difficult ones. Information of this sort might prompt us to look at some of the learning resources, criterion tests, and learner tasks associated with the more difficult objectives.

Unfortunately, Figure 7 tells us nothing about learning resources, criterion tests, or learner tasks. We might find our interest in those areas better served by using a slightly more sophisticated record-keeping form that would provide us with information about those specific matters.

The form displayed in Figure 8 derived from program objectives illustrated in Figure 4, represents a possibility we might consider. Figure 8 provides information regarding certain learning resources and their relationship to basic and expanded (enrichment) understandings of objectives. The objectives are ordered according to their level of difficulty.

Figure 7

A Learner-Progress Record Developed from Figure 3

Goal I: The learner will come to appreciate the free exchange system as represented in our securities markets.						
KEY work on objective begun 9/4 work on objective completed 9/4 9/12 work on objective begun, but not completed 9/4	Objective A The learner will identify accurately selected securities market terminology.	Objective B The learner will describe in outline form key events in the history either of the New York Stock Exchange or of the American Stock Exchange.	Objective C The learner will distinguish between common stock and preferred stock.	Objective D The learner will point out the reasons companies issue bonds and debentures.	Objective E The learner will describe the operation of warrants and stock options.	Objective F The learner will differentiate between puts and calls and will describe possible advantages to writers of both put and call options.
Abrams, A.						
Bentz, B.						
Cole, C.						
Denny, D.						
Ender, E.						
Fogg, F.						
Gear, G.						
Howard, H.						
Islip, I.						

The format displayed in Figure 8 yields much more information about each learner's use of learning resources. An examination of a completed Figure 8 form can tell us what specific learning resources were used by each student. Further, the separation of these learning resources into the categories of overview and enrichment can tell us something about the depth of exposure each youngster received on each objective. We might, too, pick up an occasional pattern of a learner who skipped much of the overview material to go into the enrichment items. Such a pattern might lead us to ask whether such an individual brought a great deal of prior information to this task or whether that person plunged recklessly into the enrichment materials without first mastering the fundamental concepts.

While the form introduced in Figure 8 does not extend the inferences we may draw from our data, there is a rather restricted focus on the issue of learning resources. While the form provides us with detailed information about materials usage, it is deficient in terms of providing a record of which learner tasks were accomplished and which criteria were met for each objective.

If we are interested in information regarding learning tasks and criteria, we might wish to use a record such as that displayed in Figure 9. Figure 9 introduces a form that is an extension of the program-objectives form depicted by Figure 5 in the first section of the chapter. Note that individual tasks that support each objective are indicated. In addition, specific criteria for successful completion are included for a number of these tasks. Objectives are ordered according to increasing levels of difficulty from "A" through "F."

Information gathered through use of this form can help us to assess the progress of each learner on each task related to each objective. Rather than being forced to make judgments about the appropriateness of given objectives for given learners on the basis of the nature of the objectives themselves, we can use the data provided by the form in Figure 9 to refine our analysis of the appropriateness of the several learning tasks for each individual learner. We might, for example, find evidence that a large number of learners were having difficulty completing task A1 (an oral report to the teacher following a reading of some *Wall Street Journal* microfilms). Since objective "A" has been classified as the least difficult, such a pattern would suggest to us that something was amiss with the learning task or with the learning materials. (One caution: There is, of course, a possibility that we misclassified the relative difficulty of the objective itself. Decisions in these matters are not always error-free.)

Some of the tasks listed on this form include specific criteria. This information tells us not only which task was completed but also what standard we accepted as evidence of adequate accomplishment. Criterion levels, it will be noted, were not included for all of the tasks listed on the form. If we were particularly interested in this matter, we might wish to refine the form further by writing criterion standards for those tasks that lack them.

The form depicted in Figure 9 does not answer every question we might wish to ask. For example, nothing is included about the types of objectives involved. Additionally, we know nothing about the number of tasks to be completed to satisfy each objective. The number of objectives to be mastered to achieve a minimal understanding of the goal is not specified. If any of these items were issues of great importance to us, we could modify the form, or develop something entirely different, to provide us with the information we wanted.

Though there are information gaps, this form does provide us with a generous amount of information. We can make quite sophisticated inferences from these data relating to such concerns as individual learner's work patterns, levels of

Figure 8

A Learner Progress Record Developed from Figure 4

Goal I: The learner will come to appreciate the free exchange system as represented in our securities markets.

KEY	Objectives											
	A		B		C		D		E		F	
	overview	enrichment	overview	enrichment	overview	enrichment	overview	enrichment	overview	enrichment	overview	enrichment
material begun 9/4 material completed 9/4, 9/12 material begun, but not completed 9/4	Smith: *A Student Views the Street* (all) Pearce: *Commerce Canyons* (Ch. 9)	*Wall Street Journal*, 7/7/74, p. 7 *Curbing the Bears is no Bull*	Powell: *The Tinsel Merchants* (Ch. 1)	Biggs: *Under the Buttonwood Tree* pp. 18-69 Jones: *Swindlers, Swingers, and Swags-30 years on the Street* (Ch. 8)	Bolch and Smith Co. pamphlet: *"Common is to be Preferred!"*	Lyons: *Common is King* (Ch. 7) Ilg: *Preferred Profits through Preferred Stocks*	Craig: *How Industry Builds Itself*, pp. 54-73	Feigle: *Capital Generation*, (Ch. 5) *Moody's Bond Survey* (selections) *Barron's* (selected issues)	Smith: *The How's of Warrants*, pp. 15-48 Pauly: *Optioneering*, pp. 4-23	Twouhy: *Dollars "On the Cheap"* *Wall Street Journal* (selections) Ward: *Millions for Sense*	Steig: *Let's Trade*, pp. 10-25 *Wall Street Journal* 6/7/71 (p. 5)	Buus: *Successful Option Trading* *Journal of Commerce* (selected issues)
Abrams, A.												
Bentz, B.												
Cole, C.												
Denny, D.												
Ender, E.												
Foffer, F.												
Gear, G.												
Howard, H												

Figure 9

A Learner Progress Record Developed from Figure 5

Goal I: The learner will come to appreciate the free exchange system as represented in our securities markets.

KEY

date task begins 9/4

date task completed 9/4 9/12

task begun but not completed 9/4

	Objectives											
	A		B		C		D		E		F	
	task A1	task A2	task B1	task B2	task C1	task C2	task D1	task D2	task E1	task E2	task F1	task F2
	See *Wall Street Journal* microfilms for 6/7/69 (page 6). Oral report to teacher will include origins of terms "bull," "bear," "curb."	Read Smith, pp. 6-31. Pass criterion test with 80% accuracy.	Prepare a time line chart from 1800 to present using critical events from Powell, Chapter 1.	Interview a broker concerning protection of investor now as compared to 1800's. Write up interview using *U.S. News* format.	You head a corporation. Prepare a written response to a shareholder's question about why your company issues preferred stock.	Prepare a chart listing features of common stock and preferred stock.	Read Craig, pp. 59-73. Pass quiz over fundamentals of bonds and debentures with 80% accuracy as a minimum.	Using data to support your conclusions, prepare a report to a Board of Directors suggesting ways your company can raise $150 millions.	Prepare a bibliography of at least twenty-five entries where one can find information about warrants and stock options.	Read Smith, pp. 15-48 or Pauly, pp. 4-23. Pass quiz on warrants/stock options with 80% accuracy or better.	Prepare a chart illustrating differences between a "put" and a "call."	You own 100 shares of a company. Under what conditions would you consider (a) writing a "put" option, (b) writing a "call" option.
Abrams, A.												
Bentz, B.												
Cole, C.												
Denny, D.												
Ender, E.												
Foffer, F.												
Gear, G.												
Howard, H.												

difficulty of objectives, appropriateness of learning tasks, and adequacy of criterion standards (where provided).

Using these inferences to develop and refine the diagnostic procedures and selection of learning activities decisions is the focus of Chapter 4. With basic record-keeping procedures in hand, we are in a position to begin building toward a more comprehensive record-keeping system.

As a final note, we would like to mention that while we have used the term basic record-keeping system, we suspect these procedures will soon come to be seen as comprising only a rudimentary system. This is not, however, to minimize the importance of record-keeping procedures focusing on objectives and evaluation. Indeed, instructional programs that do not focus on explicit goals and objectives and that do not monitor learners' progress in terms of these goals and objectives can be neither responsibly managed nor systematically improved. We suspect that for many this statement is nothing more than a redundant re-affirmation of what they already believe and practice. What is new or basic to some is old, familiar, or minimal to others.

So, whether we are old hands at systematic instructional planning, evaluating, and record keeping or new recruits, we are bold enough to suggest that we may soon be extending the possibilities of the record-keeping procedures suggested in this chapter to their feasible limits, even though we lack all the information we would like to have. In the next chapter, procedures for extending the basic record-keeping system into a more comprehensive program will be introduced. These techniques will focus on data gathering, storage, and interpretation.

A MORE COMPREHENSIVE RECORD-KEEPING SYSTEM

For those who have battled in the trenches of learning and teaching for more than a year of two, spring marks the beginning of a four or five month period of reflection upon the past year's events. Annually, we begin debriefing ourselves about this past year and start making plans for the next.

Unfortunately, much of this intellectual energy is randomly focused. Often the small amount of information available to us allows only for cursory analyses of the year's successes and failures. Nor do we usually have available the information needed to serve as a solid foundation for the development of new procedures. Yet, as we know from the previous chapter, continuous program development that is characterized by deliberate and definable steps toward improved instruction can occur only when we have access to reliable information about the success of our programs in terms of learner progress.

Records of learner performance, the effects of a program, represent only part of the total information base needed to sustain a systematic program improvement effort. We also must have available information about the program itself. Without a record of what occurred during the instructional program, our learner-progress records have limited usefulness. There is, then, a cause-and-effect relationship between our instructional program and learner success. If we accept the existence of this cause-and-effect relationship and recognize the instructional program as the most significant component in the "cause" half of the relationship, then we have a rationale for developing a comprehensive record-keeping system that maintains a tight focus on the instructional program. See Figure 10.

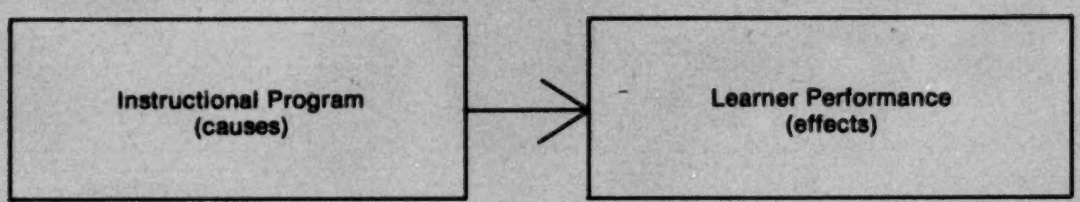
If we assume that there is a causal relationship between instructional programs and the learner's performance, then we must ask: What antecedent instructional events might be related to or be causes of the consequences or effects observed? The question cannot be answered with confidence if we have only the Basic Record-Keeping System to fall back on. Systematic and confident change in program effects requires us to gather information about the program itself because the program is the most likely "cause" of the program "effects."

NASA's success in putting an astronaut on the moon would have been achieved much less rapidly had it proceeded only on the basis of theory, principles, intuition, and presently available practice and technology. Instead, NASA chose to take a developmental approach; to take specific, controlled, and purposeful small steps toward its long-range goal. Each successive phase in the NASA program was taken after consideration of what had been learned in previous steps. By carefully specifying the development objective and collecting information about the process used to achieve it, NASA was able, at each step, to say: "We had these successes and these failures, and our information, describing all of what we did prior, leads us to believe that these modifications or considerations must be applied to the next mission."

Launching a space vehicle and noting that it did reach the moon (success) or did not (failure) is analogous to launching a school year and, through record-keeping procedures outlined in the preceding chapter, noting whether the learning goals had (success) or had not (failure) been met. In both cases, replicating these successes (astronaut on the moon or learning achieved) or eliminating the failures (astronaut lost in space or student just lost) depends upon how well program managers document the strategy, make decisions, use procedures, and follow sequence during the mission. In the case of success or failure (effect or consequence), subsequent success or failure will be affected by our understanding what we did the first time (some record of antecedent events or probable causes).

Figure 10

A Cause and Effect View of Instruction



In short, the success of the USA space program was, more than anything else, due to the practice of precise and rigorous documentation of each and every decision, act, and event completed enroute. At each step in the program, from unmanned flights to landing on (and returning from) the moon, NASA consistently identified its objectives, developed a plan for achieving them, and documented all action. No matter the outcome at each step, all preceding actions were analyzed and adjustments made dependent upon the results. If a particular procedure, device, or technique worked, it was employed again. If not, an alternative was developed and tested until a workable replacement was available.

Returning to the classroom, we find ourselves faced with questions similar to those faced by NASA. If success is documented (recorded), how can it be repeated? How can we insure the same or better outcomes again? If failure of some kind was documented, how can it be avoided next year? How can we change the program to avoid that failure?

As with NASA, the answer lies in the information available regarding what took place prior to the outcome observed. What occurred between blast-off and splash-down? If we can maintain a record of the critical or major decisions made and actions employed, we enhance our chances of repeating success and avoiding failures. Our discussion of a Comprehensive Record-Keeping System is devoted to the goal of systematic instructional improvement. Although the Basic System in the preceding chapter allows for documentation of outcomes (effects or consequences), it provides little information to serve as a basis for analyzing the instructional program itself (probable causes or antecedent events).

Returning to our model of the instructional process, we note that the Basic System speaks to the question of objectives or intentions versus outcomes or successes. See Figure 11. Use of that system, whether applied to instruction or the space program, always requires clear identification of objectives and careful observation and recording of the outcomes.

Between objectives and outcomes lies *program*. A program can be described as a series of events that represent our hypotheses (hunches) about how to best reach the objectives. Metaphorically, we are dealing with a black box and, unfortunately, one that seldom gets opened, analyzed, or tinkered with. Our contention is that systematic program improvement depends upon how completely we can open that box and examine what goes on inside. A Comprehensive Record-Keeping System can allow us to begin such an examination.

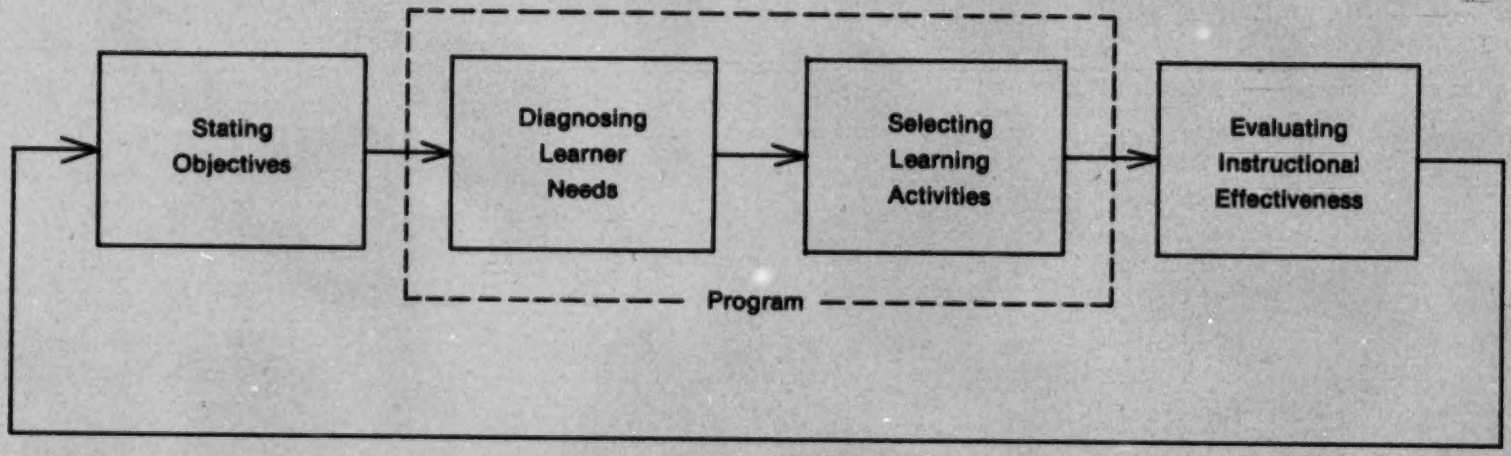
A Comprehensive System, once operating, becomes a data bank, with information continuously flowing in. Both day-to-day and long-term instructional decisions are based on the inferences we draw from it. We can use the data being recorded during the year to guide our decisions regarding the best instructional experiences for each student. At the end of the term, the data bank allows us to conduct a comprehensive analysis of the instructional program, leading to decisions regarding revision of the program.

Two basic categories of information must be collected in order to have a usable data bank: (1) information about the learner (diagnosis), and (2) information about the learning experiences as completed (prescription). The type of information we collect for each category depends upon (1) the nature and characteristics of our instructional program, and (2) the developmental questions we want to be able to answer at the end of the term.

The amount of information we record (comprehensiveness and level of detail) depends upon the above three factors and cost. Costs are of two general types: behavior (people time) and direct (equipment, production, storage, etc.).

Figure 11

Relationship of Program to a Model of Instruction



It is important to note that the ultimate record-keeping system cannot be presented here. Until the above matters have been dealt with in the context of a specific program and school, our consideration of the Comprehensive System must be somewhat general and advisory.

Diagnostic Information

> Definition: Diagnosis is the process by which the condition of the learner at a given point in time is described in relation to certain factors, for the purpose of determining that learner's needs.

The process of diagnosis, in an instructional setting, has been thought by some to be the same as the medical process from which the term is derived (i.e., a doctor examines the patient's symptoms and the pattern of these symptoms leads him to the diagnosis that a certain disease or dysfunction is present). This analogy is spurious, however, for it implies that diagnosis in a learning situation identifies or defines a knowledge "disease" or "disorder" rather than a specific need or cluster of needs, which is what actually takes place. Diagnosis in education, then, is more accurately viewed as a needs assessment process. In such a process, we use our professional skills and the instruments and techniques available to us to examine the present state of the learner in relation to intended learning outcomes or objectives, usually arrayed along a continuum or in a hierarchy.

One weakness of the diagnostic process in education is that historically it has focused only on the analysis of the learner's cognitive needs, as measured by certain tests. A more sophisticated and comprehensive diagnosis process might also include a continuous assessment of the learner's interest, aptitudes, and learning style(s). While these additions would undoubtedly add to the complexity of the process, the precision and usefulness of the diagnostic information would be enhanced.

The diagnostic process in education involves a consideration of three diverse kinds of information that lead to a prescription for learning which best meets the needs of the student. These three considerations are: (1) the profile of learner needs, (2) the structure of the learning program, and (3) the learner placement data.

Profile of Learner Needs

Each learner exists in a complex milieu, subject to the interaction of many factors and forces. Socio-economic level, family stability, peer relationships, and health are elements which have been shown to correlate with an individual's ability to learn. No comprehensive or reliable process now exists that assesses and considers these factors in diagnosing learning needs. It is imperative that our increased professional skill and personal sensitivity provide for consideration of these factors in some way as part of the needs-assessment process. At the very minimum, we should be aware that diagnosis in education is in an inchoate state of development and is not a comprehensive, precise, and consistently applied process.

Most existing diagnostic processes focus only on the achievement level of the learner as measured by an achievement test of some sort. However, there are other significant elements, and many of them are amenable to relatively precise assessment. These include:

1. Reading level
2. Cognitive style
   a. concrete
   b. abstract
3. Learning style
   a. visual
   b. auditory
   c. kinesthetic
   d. mixed
4. Need for structure
   a. prestructured programs with constant teacher guidance
   b. prestructured programs with minimum teacher guidance
   c. prestructured programs with branching activities (student's choice)
   d. open programs (student developed and directed)
5. Preferred mode of instruction
   a. independent
   b. one to one
   c. small group
   d. large group.

In addition to the foregoing, we can collect other information including the learner's general areas of interest, physical handicaps (if any), and other special needs. The more information in manageable form available, the greater the precision of diagnosis and the greater the potential for making effective and efficient prescription or remediation decisions.

Structure of the Learning Program

Learning program is used here in a general sense to denote the sum total of learning activities available to the teacher in a given setting. Basically, all instructional programs are organized in some sort of logical or developmental sequence. The concepts comprising any such sequence are identified and arranged in a teaching or learning order. We can determine the necessary level of attainment for any one learner through decisions that take into consideration (a) the importance of any particular concept in the scheme of the course, (b) the importance of the course in the K-12 educational program, and (c) its impact upon the future learning of the student.

In an individualized learning program, the sequence and levels of concepts, once determined, must be objectified so we can determine when a student has mastered the concept or the skill. This generally implies a test of some sort, though not necessarily of the paper and pencil variety.

These components—the concept, its behavior objective, the performance criterion or test—comprise a single, general learning package. We need one of these packages for each concept being taught. In addition to this learning package, one more essential element must be included if the program is to utilize an individualized approach. The generalized learning package must be keyed to specific prescriptive alternatives (learning activities) which take into consideration the learning needs of the individual. For example, if the Learner-Needs Profile provides data on the five components suggested previously (reading level, cognitive style, learning style, need for structure, and preferred mode of instruction), then prescriptive learning activities must be developed which take into consideration the various combinations of these components in treating the concept on which the generalized learning package is based.

Learner Placement Data

Given the availability of Student-Needs Profile data and the existence of a learning program structure which takes such need variations into consideration, there is still an additional necessary element for a complete diagnostic and prescriptive system. That element focuses on decisions about our initial placement of the learner and the learner's subsequent movement within our program. Our process for providing this information consists of three phases which are, in ascending order of generality:

1. post-tests of performance of specific concepts or skills
2. placement tests covering units composed of a number of generalized learning packages (e.g., mathematics)
3. level tests which provide an estimate of where in the sequence a learner should begin the placement test.

Our development of the test of performance of skill (post-test) consists of assessing several items from the component packages comprising the unit. To develop the level test, we divide the subject matter sequence into levels according to the amount of time required to cover the sequence. As part of this process we also divide into levels the generalized learning packages, the component tests, and the diagnostic placement test. For each level, then, the test items within the diagnostic placement test are scanned and those are selected which—

- are most representative of the level.
- measure concepts newly introduced in the level.
- reflect changes in the difficulty level of the concepts already presented.

Next, similar or parallel items are written for the level test. (Note: These guidelines are also used when developing the diagnostic placement test from the package post-tests.)

The above three kinds of information, *Learner-Needs Profile, Structure of the Learning Program,* and *Learner Placement* are central to the diagnostic component of a Comprehensive Record-Keeping System. Data of this type, when placed in the data bank and analyzed in light of other data in the bank, improve the basis upon which we make day-to-day instructional decisions. In addition, we will have cumulative data to use in making subsequent program improvement decisions. Using this information, we will be able to partially open the black box. Further opening of the box will be possible when records of our prescriptions (the learning activity decisions) are maintained.

Prescription Information

> Definition: Prescription is the act of modifying learning activities or sequences in order to accommodate the diagnosed needs of each learner.

As was the case with diagnosis, *prescription* represents another term from the field of medicine that takes on a slightly different connotation in education. In education, rather than curing ills, our purpose is to help the learner grow and develop by attaining certain goals and objectives. Essentially, the act of prescrib-

ing involves a blending of our information about (1) the learner, (2) the objectives of the instructional program, and (3) the available learning activities. In prescribing, we act upon available information, along with a modicum of intuition, to make an educated guess about the best next step in the learner's development. This acting upon information constitutes making a decision. We need to record information about this decision for later use–next day, next week, or for revising the program for the next term.

Remember our example of NASA? Because they collected information about what is or has been done, acted upon that information (made decisions), and kept a record of what had been decided, they were able to maintain a steady drive toward their long-term goal. Teachers and others responsible for the results of an instructional program must also equip themselves to engage in similar developmental or growth process. We can accomplish this goal only when adequate records are kept of all critical information about learners and the decisions made about them in school programs.

What features of a prescription decision are important is a matter that varies from one instructional program to another. However, we should consider the following for inclusion:

1. The materials used or suggested, related to a particular learning objective or task (portions of a text, LAPs, worksheets, filmstrip)
2. The time for completion of each objective or learning activity (two hours, or three class periods, or two hours over the course of two weeks)
3. The learning mode (independent study, small group, large group, face to face)
4. The learning media (print, graphic, audio, combination).

Again, we wish to reiterate the point that the specific information to be handled by any particular record-keeping system depends upon the information needs of the user, the nature of the program being operated, and the cost limits imposed.

Building a Comprehensive Record-Keeping System

As we noted at the beginning of this chapter, a "Comprehensive Record-Keeping System" is an extension of a "Basic Record-Keeping System." The Comprehensive Record-Keeping System should provide for the recording of information that is germane to our program. This information will assist us in making decisions and provide us with a bank of data we can use to review our programs.

Figure 12 represents one way a record of learner diagnostic information can be maintained. The information to be recorded is similar to that discussed earlier in this chapter. Again, a particular teacher or staff may well choose to modify the categories of information to be recorded in order to better suit the program being operated or the manner in which the program is operated or is to be reviewed.

Figure 12

Sample Diagnosis Recording Form

Student's Name	Code	Sex	Age	Reading Level	Cognitive Style	Structure	Learning Style	Preferred Mode	Test Score One	Test Score Two

Figure 13 illustrates the form complete with data. After studying this hypothetical data, we can draw several preliminary inferences regarding the characteristics of the individual learners and the group. All of these inferences will, in some way, influence the manner in which each learner and the group is taught.

For example, learner 03 presents a somewhat unusual profile—low reading level, concrete cognitive style, preference for structure, aural/kinesthetic learning style, and the tutorial mode. Test scores are not particularly deviant, plus or minus. A fairly safe inference we might draw from the profile is that this learner will make acceptable progress if the teacher provides learning activities that require little reading and include more interaction with concrete rather than abstract information. In addition, we might predict that this learner will feel most comfortable when the learning activities are carefully and clearly sequenced, involving as much one-to-one contact with the teacher, or others, as possible. The information and inferences seem to take on additional validity when we later discover that this learner has a moderate vision deficiency.

Learners 09 and 17 are each quite different from the balance of the group and, in some respects, different from one other. In the case of 09, we have a relatively young (15) male with high achievement test scores, whereas in 17 we have one of the oldest learners in the group (18), a female, also with high test scores. In most other respects, they are very similar to each other. Both are above average readers, can deal with abstractions, are productive when placed in an open or self-managed situation, learn successfully through aural or visual presentation, and prefer independent modes of learning. These two learners seem sufficiently successful and motivated so that we can put them on their own.

Learner 12 presents a rather mixed profile—adequate reading ability, two quite different test scores, etc. We might infer that she has ability but has achieved erratically. Given her preference for open or self-managed structure and the small group or independent mode, we might hypothesize that performance will drop off when she is confronted with too much structure and/or large group situations. However, when we acquire other information, such as that dealing with home conditions, social life, etc., we might draw different conclusions and develop alternative hypotheses.

At this point, we suggest that you study the profiles of learners 06, 11, 18, and 20. What inferences would you draw from each and what implications might they have for you in terms of designing instruction for each?

As a group, they seem to be able learners with generally adequate reading ability and achievement test scores (columns a and f). In terms of cognitive style (column b), they seem to be equally split between those who can and those who cannot successfully deal with abstractions. Need for structure (column c) seems to be indicated for all but about seven learners. The amount or degree of structure does vary, however. As is also indicated by tested reading ability, most can learn successfully through the visual mode (primarily reading), with about five preferring or performing better in the aural mode (column d). In column e, preferred social mode, we again have a mixed profile. Generally, there are as many indications of preference for large and small group modes as there are for independent and tutorial. Yet, there are only a few who seemingly prefer the large group mode, and almost one-half of the students indicate preference for the small group.

The above types of information about learners, when examined in conjunction with placement information (entry level skill/knowledge) and the general design of the program, provide a basis for making some initial decisions about program design. In addition, it becomes part of the data base used later in the process of program review and revision.

Figure 13

Key to Data on Sample Diagnosis Recording Form

(a) —: Below 1 S.D.
+: Above 1 S.D.

(b) C: Concrete
A: Abstract
I: Inductive
D: Deductive

(c) ST: Structure with teacher direction
SG: Structure with teacher guidance
SS: Structured self-selection among options
OR: Open with structured review
OS: Open self-managed

(d) V: Visual
A: Aural
K: Kinesthetic
AV: Aural/Visual

(e) I: Independent
T: Tutorial
S: Small Group
L: Large Group

(f) As deciles

Figure 13

Sample Diagnosis Form (Hypothetical Data Recorded)

Student's Name	Code	Sex	Age	(a) Reading Level	(b) Cognitive Style	(c) Structure	(d) Learning Style	(e) Preferred Style	(f) Test Score One	(g) Test Score Two
	01	F	18	✓	A	SG	A/V	L	7	7
	02	M	16	—	A	DS	V	I	5	8
	03	F	17	—	C	ST	K/A	T	6	6
	04	F	16	✓	C/D	ST	AV	I	5	7
	05	F	16	+	A/I	SS	V	S/T	8	7
	06	M	18	—	C	SS	AV	T	4	3
	07	M	16	✓		OR	V/A	L/S	7	7
	08	F	16	✓	C	ST	A	L	6	7
	09	M	15	+	A	OR	A/V	I	9	9
	10	M	16	+	A	OS	V	I	6	7
	11	M	16	—	C	SS	V	T/S	7	8
	12	F	17	✓	A	OS	V	S/I	9	5
	13	F	17	✓	C	SG	A	L	6	5
	14	M	17	+	A/I	OR	A	I/S	9	8
	15	F	17	✓					7	
	16	M	16	✓	C/D	SG	A/V	L/S	7	8
	17	F	18	+	A/I	OS	A/V	I	9	9
	18	M	17	—	C	SG	V	T/S	8	8
	19	M	17	✓						
	20	F	16	—	C	ST	A	S/T	6	5
	21	F	17	✓	I	SS	V	I/T	5	5
	22	M	17	+	A	SS	A/V	L	8	9
	23	F	16	✓	A/D	SS	V	S	7	8
	24	F	17	✓	C	SG	A	S	5	7

However, there is one caution we need to be aware of and that is the matter of the validity and reliability of the information recorded. We don't propose a complete discussion of this matter here, but a few points can be made.

First, we must always consider whether or not the data are true—that they do indeed reflect the characteristics or attributes reported. This is the general problem of validity, often talked about in terms of confidence. That is, how confident can we be that this score or mark indicates what we think it does?

Second, we must consider the matter of reliability of the information. Here the question is one of consistency. If the learner were again tested or observed, with the instruments used previously, would we be likely to get the same score? In the case of information gained through formal or informal observation, we are faced with the question of whether or not another person would see the same things as we did. Furthermore, would the same person see the same thing the next time.

Thus, reliability (consistency) and validity (confidence) are two of our major concerns as we attempt to draw inferences or meaning from recorded information. Even with very reliable and valid information, we must still keep our inferences tentative if we wish to avoid the pitfall of a self-fulfilling prophecy such as: "I conclude that this learner is of low ability, therefore, I will treat him as such." The probable result is that the student will continue to demonstrate low ability; we did not expect anything else.

The other major part of our strategy to open the black box involves the actual design and operation of the instructional program itself. Here, our record-keeping task requires us to document all important decisions made and actions taken. Essentially, we want to gather information that will allow us to gain confirmation of the accuracy of our earlier predictions, as well as aid us in our efforts to meet the needs of each student as the program goes on.

For example, we made certain decisions about how to approach learner 03, based upon our diagnostic profile. As such, these decisions represent an hypothesis that should be tested in some manner. We want to collect information that will enable us to say later: "That was (or was not) a correct decision to make, because when the learner did "X" his performance was "Y." Systematic improvement in instruction comes about best when we are able to compare a decision made earlier to results observed later.

We also want to be able to make cause-and-effect statements about each learner in our group and about our group generally. With this end in mind, we have stated our objectives and designed our programs on the basis of those objectives and our diagnostic data. Now, we need information about who actually did what, how, under what conditions, when, in what order, and with what success.

Figure 14 illustrates one type of form we can use for these purposes. It is organized so that alpha/numeric codes can be used to list objectives/tasks, and prompts us to collect needed types of information (columns c-h) about the learner's completion of the tasks and objectives. Teacher observations can be recorded in column i.

Figure 14

Sample Learner Progress Recording Form

Learner _____ Program/Course _____ Term _____

Objective (a)	Task or Activity (b)	Learning Mode (c)	Instructional Media (d)	Group Structure (e)	Cognitive Process (f)	Begin Date (g)	End Date (h)	Anecdotal Notes Referenced to Task or Activity Number (i)
	1							
	2							
	3							
	4							
	5							
	6							
	7							
	8							
	9							
	10							
	11							
	12							
	13							
	14							
	15							
	16							
	17							
	18							
	19							
	20							
	21							
	22							
	23							
	24							

Figures 15 and 16 illustrate how entries of this form may appear. The objectives for the economics course (see the preceeding chapter) are coded in column a, with the tasks associated with each listed in column b. In columns c-f, information related to the nature of the task completed is recorded. Columns g and h record the beginning and completion dates, with column i providing space for recording anecdotal/clarifying notes.

We now have all the required components of a comprehensive system—objectives, diagnostic data, records of actions taken, and confirmation of outcomes. If designed with care and an eye toward getting the most information for the least costs, the instructor will have access to information that will allow deliberate program development and make the annual debriefing much less of a guessing game. The key to success comes back again to the necessity to center our record-keeping procedures on our own instructional program. Tightly focusing on our own program and objectives, procedures introduced here offer the possibility for helping us move closer to our aim of meeting the peculiar instructional needs of each student.

Figure 15

Sample Learner Progress Recording Form

Learner 06 Program/Course Econ Term First

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	Anecdotal Notes Referenced to Task or Activity Number (i)
I A	1							(7) Needed help w/vocabulary
	2	I	V	SS	C	9/12	9/13	(6) (11) Seemed to enjoy these;
I B	3							begins them w/enthusiasm
	4	I/T	A	SS	C	9/13	9/17	
I C	5							
	6	I	V		C	9/13	9/18	
I D	7	I	V	SS	A	9/18	9/25	
	8							
I E	9			SS				
	10	I/T	V	SS	A	9/20	9/22	
I F	11	S	A/V	SS	C	9/21	9/23	
	12							
	13							
	14							
	15							
	16							
	17							
	18							
	19							
	20							
	21							
	22							
	23							
	24							

Figure 16

Sample Learner Progress Recording Form

Learner 12 Program/Course Econ Term First

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	Anecdotal Notes Referenced to Task or Activity Number (i)
A	1							(8) Needed my help
	2	I	V	SS	C	9/12		(3) (6) with students 13, 18, 14
B	3	S	AV	SS	C	9/13	9/15	(2) (9) Vocab. too complex
	4							
C	5							
	6	S	AV	SS	A	9/16	9/20	
D	7							
	8	T	V	SS	A	9/20	9/23	
E	9	I	V	SS	C	9/20		
	10							
F	11	I	V	SS	A/I	9/21		
	12							
	13							
	14							
	15							
	16							
	17							
	18							
	19							
	20							
	21							
	22							
	23							
	24							

PUTTING THE SYSTEM TO WORK

Anyone who has made an attempt to change personal behavior (smoking, biting fingernails, slouching posture, etc.) knows that staying with the program is difficult. The deep commitment, sincere desire, and high excitement characterizing the early phase of such an undertaking soon diminish. What began as a high priority slips to a not-so-high priority. Many personal reform efforts ultimately fail to achieve any persistent change of the targeted bad behavior, and all too soon smoking, fingernail biting, or slouching make an unwanted reappearance.

In addition to personal mannerisms, the professional lives of educators tend to re-affirm habits of long standing, whether good or bad. Educational innovation's graveyard is littered with good practices that were discarded because the physical or psychological effort-to-payoff ratio came into question. Frequently September's enthusiastic commitment to procedure "A" becomes November's rampant suspicions about the real value of procedure "A." Teacher-kept records, particularly in individualized instructional programs, epitomize this cycle.

In the case of record-keeping procedures in individualized programs, early enthusiasm for gathering all information too frequently leads to a paperwork jungle that prompts a frustrated abandonment of the entire enterprise. To protect themselves from living out this unhappy scenario, teachers need to consider a systematic approach for determining how much of their energies will be consumed by record-keeping tasks in any individualized instructional system they are contemplating.

In devising a set of decision rules to follow in adopting a given record-keeping procedure, efficiency must be the central concern. If the record-keeping system adopted yields valued information and is not a burden to maintain, it will be continued and refined–as well as the individualized instruction program it supports. On the other hand, even if the system yields valued information, it will fall from use if it is a burden to maintain. Once initial interest in the system fades and the system is no longer regarded as an exciting novelty, inefficient record keeping becomes a daily task that the teacher will or would like to skip.

Efficiency of record-keeping systems results when decisions are made that optimize relationships between (1) benefits desired, and (2) available teacher time. For example, a miserly allocation of teacher time clearly will prove to be inadequate should a lengthy list of benefits be desired. On the other hand, should desired benefits be few in number and easily obtained, a decision to set aside a large block of teacher time for record keeping represents an indefensible time cost that more responsibly would be allocated to other instructional tasks. Clearly teachers do not have time to keep records on all matters of professional interest. Priorities in terms of desired benefits must be established. Time must be husbanded and allocated to record-keeping tasks clearly capable of providing high priority information.

Information benefits that are important enough to warrant investment of teacher record-keeping time can be derived from the performance objectives that guide a given unit of work. Each performance objective specifies desired learner behaviors and criteria for successful achievement. These behaviors and achievement criteria suggest certain information needs that can be met by the outputs or information benefits of the record-keeping systems.

Information needs capable of being derived directly from the language of a given performance objective can be designated as high importance needs. High importance needs are needs for which information benefits from the record-keeping system are a must.

Information needs that cannot be derived directly from the language of a given performance objective but which can be inferred from the general universe of concern delimited by that objective can be classified as *moderate-importance needs.* Moderate-importance needs are needs for which information benefits from the record-keeping system are desirable but not a must.

As an example of how a distinction might be made between *must have* and *desirable* information benefits, consider the following performance objective:

> Students in 8th-grade language arts, after reading "The Peddler of Bellaghadereen," will write sentences that, in every instance, will include a metaphor. Achievement of this objective will be measured on a posttest in which at least 8 out of 10 sentences will include figures of speech that meet the basic requirements of metaphors.

For the purposes of organizing information into a logical framework, *high-importance information needs* derived from the language of the objective can be subdivided under (1) knowledge, (2) skills, and (3) hoped-for attitudes.

Knowledge

The lesson is directed at teaching the concept of metaphor well enough for learners to successfully generate examples of metaphors. Conceivably, a few students might have such an ability before instruction begins. Certainly a pretest designed to probe the learner's ability to generate examples of metaphors will be in order so that some are not forced to study what they already know. Records must be kept of learner achievement on these pretests.

The language of the objective refers to figures of speech. An implication is that learners have an adequate grasp of the term. A measure of the learner's understanding of the term is indicated. Records reflecting the learner's performance on this measure should be maintained.

Skills

The language of the performance objective points to a specific stimulus material ("The Peddler of Bellaghadereen"). This stimulus assumes an ability of the learner to read with understanding prose materials at the level of difficulty of "The Peddler of Bellaghadereen." Using a CLOZE procedure or another technique which yields a measure of the learner's capacity to read with understanding material at this level of difficulty, the teacher will generate information for which records must be maintained.

Hoped-for Attitudes

The stimulus material, "The Peddler of Bellaghadereen," is a folktale. In addition to difficulties associated with mechanical reading processes (decoding), some students seem to have difficulty learning concepts that are embedded in prose passages because they react negatively to the type of prose material they are required to read. While many learners enjoy folktales, for others they are an anathema. A rating scale according to which learners are assigned a preference rating for folktales as opposed to other prose forms (travel stories, biography, mysteries, etc.) might provide helpful information. Records of individual youngster's ratings would be kept.

Summarizing, in terms of high-importance needs derived directly from the language of the performance objective, the following information benefits must accrue from the record-keeping system:

1. Information about degree of understanding of the term metaphor.
2. Information about degree of understanding of the term figure of speech.
3. Information about ability to read with understanding prose written at the level of "The Peddler of Bellaghadereen."
4. Information about the learner's relative preference for folktales as opposed to other prose forms.

Record-keeping schemes that yield information benefits that respond to those identified as high-priority information needs have first call on available teacher time. Hopefully, teacher time can be expanded to the extent that all high priority information needs can be met. By focusing tightly on guiding performance objectives and deriving high priority needs directly from the language of those objectives, the number of high priority information needs typically can be held low enough to permit the teacher to keep records and generate information benefits without robbing time from the other necessary instructional tasks that are an important part of the teacher's job.

To protect against the possibility of allocating too much time for record keeping, it is desirable that a teacher compute the number of minutes per week he or she regularly allocates to these procedures before starting an individualized program. Once this figure has been identified, the teacher should guard against the temptation to expand record-keeping time beyond that figure. An individualized program will demand a great deal of time for materials development and interaction with learners. An increase in record-keeping time must come at the expense of these high priority tasks.

Once available record-keeping time has been identified, if it develops that all high priority information benefits of the record-keeping system can be generated in less time than has been allocated to the task, then there are two options. First, the amount of time spent in keeping records can be decreased and the amount of time spent on other instructional tasks can be increased. Second, additional records can be kept generating information benefits designed to supplement the basic must-have data with desirable data. These desirables, like the must-have information, are derived by referring to the guiding performance objective. Whereas the must-have information relates to the specific language of a given performance objective, desirable information is inferred more broadly from the general universe of concern described by that objective. Taking as an example the performance objective cited earlier, the teacher might consider the following categories as instances of desirable information about which records might be kept:

Knowledge

1. Information about specific concepts mentioned in "The Peddler of Bellaghadereen."
2. Information about the learner's understanding of simile and other figures of speech.
3. Information about the learner's ability to move beyond a knowledge or comprehension-level understanding of a concept to an application-level understanding.

Skills

1. Information about the learner's measured grade-level reading ability.
2. Information about the learner's ability to use dictionary and other sources to identify defining attributes of metaphor and other relevant concepts.

Hoped-for Attitudes

1. Information about the learner's relative preference for reading as opposed to other activities.
2. Information about the learner's ranking of language arts as compared to other school subjects.

Certainly additional desirable information might be added to the items listed above. A critical point is that desirable information ought to related to the performance objectives even though the relationship need not be so direct as in the case of must-have information. By linking information needs to objectives, the possibility of inappropriately allocating time to gathering data that may not be of any real value is eliminated.

Use of performance objectives to identify needed information benefits contributes to the efficiency of the individualized instructional program. Since these benefits relate directly to program-related information needs, they provide logical bases for making decisions relating to program improvement. Less precisely focused record-keeping systems lose their relevance as bases for program improvement decisions.

Individualized instructional programs rarely work out in practice exactly as envisioned when relevant variables were contained on paper within elegant planning models. Continuous modification of programs, once they are implemented, is essential. When focused and efficient record-keeping procedures are lacking, decisions intended to result in productive program changes must go forward from an inadequate information base. But, when record-keeping procedures are in place that derive from guiding performance objective, the potential is there for making grounded decisions that can assure that individualized programs function in the real world as well as in the minds of their planners.

Building Learner Commitment to Individualized Instructional Programs through Record Keeping

One of the biggest surprises many of us encounter after beginning an individualized instructional program is the resistance to the change expressed by learners. This situation is likely to arise when we are working with older students at the secondary level.

Part of our surprise at the learner's initial lack of enthusiasm can be traced to the euphoric terms with which the literature tends to describe individualized instructional programs. Individualized instruction frequently has been defined not in terms of clearly described operational components but rather in terms of its supposed effects. Often individualized programs are promoted as a sure tonic for a perfectly horrible example of educational mismanagement that is presented as representing a universe of practices termed traditional education. A result of this loose advocacy of individualized instruction is the subtle implantation of an

expectation that we teachers have only to develop a program labeled individualized instruction to assure ourselves of classes peopled by eager, highly motivated learners. When this happy situation does not develop, we sometimes become frustrated with the whole concept of individualized instruction and beat a hasty retreat to more familiar practices.

Such a reaction is unfortunate for two reasons. First, if we allow ourselves to be satisfied with the fuzzy descriptions of individualized instruction as presented in much of the promotional literature, we will be left with a very poor focus for instructional planning. When our program does not work, we are not well-equipped to analyze specific deficiencies because individual program elements have been ill-defined. A simple personal insistence that program elements be clearly and purposefully defined before "launch day" will add a valuable element of security. Such a procedure ensures that when (or more appropriately if) disaster strikes, we will be able to identify the deficient program element rather than despair that the entire program is bankrupt.

A second problem has to do with our expectation that learners will respond positively to our new program. That expectation is clearly inappropriate, particularly when we are working with older youngsters. It is human nature to prize success. High school students who have been earning A's and B's in the old program are likely to have developed a commitment to that program because their success in that situation has reinforced the self-image of being a competently coping human being. When a new program such as individualized instruction is introduced, the student who has achieved satisfying personal success in the old program may well feel threatened and is likely to ask, "Can I make it under this new system?" The learner who develops any doubts at all about his or her ability to perform well in the new program is likely to resist the change and urge a return to the old way.

We should not be surprised, then, by an initial lack of enthusiasm for a newly introduced individualized instructional program. While sensitive to the probability that the problem will arise, we should not be indifferent to it and assume that, given the passage of time, it will cure itself. We need to work consciously to make our learners comfortable with our new procedures. One of the most effective methods for achieving this objective involves a gradual phase-in of an individualized instructional program. Gradualism that promotes adjustment by calling on learners to make only a few increments of change results in a greatly diminished resistance to new procedures because elements of the more familiar system remain in view at the same time components of the new system are being learned.

Another fine tactic for developing the learner's commitment to an individualized instructional program centers on the practice of involving learners in the record-keeping process. As learners become more thoroughly immersed in the program, they are better able to understand it. More importantly, as psychologists tell us, people who understand a situation well believe they are able to exert more personal control over that situation. It is precisely at the point when learners come to understand that they have at least as much control over learning outcomes in a new individualized instructional program as in the old traditional program that the threat of the new program disappears and an emotional commitment to individualized instruction begins to build.

In addition to enhancing the learner's faith in individualized instructional programs, the practice of involving students in record keeping is directed toward promoting an understanding that individual learners, themselves, must play an active role in their education. When instructional objectives and learning activities are clearly specified and learners are provided with record-keeping devices to chart

their own progress, the view that assessments of achievement are capricious judgments of the teacher will not stand. Each learner has contrary evidence. Achievement, or the lack of achievement, comes to be seen by the learner as the consequence of his or her own behavior.

From the standpoint of the teacher, encouraging learners to participate in the record-keeping process saves valuable time that can be expended more efficiently on other instructional tasks. For the learner, participation in record keeping assures that knowledge of results will be available sooner than would be possible were the teacher, alone, to keep all records for all learners. It is a principle of learning psychology that learning is more efficient when immediate results of past learning experiences are available.

Specific types of records that learners might be expected to keep will vary according to the age of the youngsters with whom we are working. With very young pupils, we might wish to consider using a ticketing procedure. Let us suppose, for example, that we were teaching a unit for which we had identified three major goals and given instructional objectives for each goal. For the purpose of maintaining records for ourselves, we might set up a large chart such as the one in Figure 17. The chart could be prepared either on a large sheet of butcher paper or on a smaller sheet for inclusion in a grade book.

With primary grades youngsters, our objectives are likely to be designed so that they can be accomplished in a relatively short time. Without some kind of an efficient record-keeping system, we may soon be inundated with paper work. One possibility for extricating ourselves from this possibility involves our using pupils to help us with our record-keeping chores through the use of ticketing.

To put this system into operation, we ask our youngsters to check in with us when they finish all of the work on any instructional objective, for example A-1. (In working with very young learners we probably would not wish to refer to anything as abstract as "A-1," but would describe the specific activity involved.) After a quick check to see that the work had been completed properly, we would give the student a ticket. The pupil would be told to write his or her name on one side of the ticket. On the other side, we would quickly jot down the number of the completed objective and initial it. An example of how such a ticket might look is presented in Figure 18.

For the purpose of holding their tickets, each student should be provided with a large 8" x 11" manila envelope. After we initial a ticket, we would tell each one to take the ticket and put it inside a big ticket envelope. For the moment, our record-keeping task would be over.

At varying intervals, perhaps once every four of five days, we can take a few minutes of class time to check on progress through the objectives. We do this by asking people with, for example, all five of the "A" tickets to come forward. We can follow a similar procedure for the five "B" and the five "C" tickets. (With very young children, an alternate approach is to color code tickets. For example, purpose for "A" objectives, green for "B" objectives, orange for "C" objectives. If we used such a system, we could begin by asking, Will everyone who has five purple tickets bring them to me?)

Each youngster who had the appropriate tickets would exchange them for a large colored star. For instance, five "A" tickets would be exchanged for a purple star, five "B" tickets for a green star, and five "C" tickets for an orange star. The students would be asked to paste their stars on the outside of their large ticket envelopes.

Figure 17

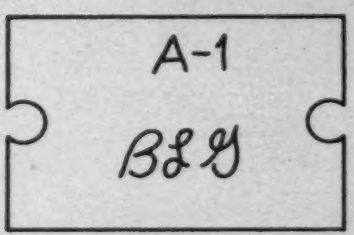
Example of a Master Record-Keeping Sheet

	A					B					C				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Peter A.															
Bobby B.															
Frank C.															
Iris D.															
Norma E.															
Karl F.															
Karen G.															
Quenton H.															

Figure 18

Examples of Learner Tickets

front of ticket



back of ticket

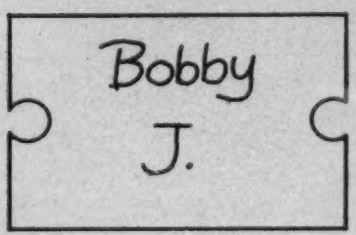
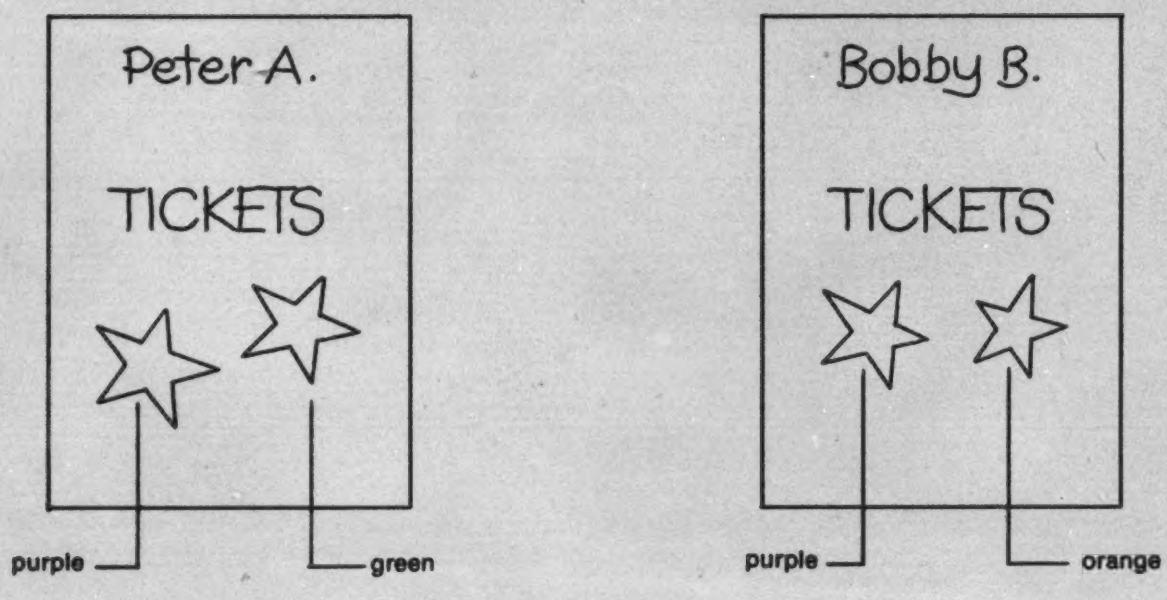


Figure 19

Examples of Learners' Ticket Envelopes



When we have some slack time, we can take a look at the individual ticket envelopes. Information recorded there in the form of stars on the outside and remaining tickets inside can be transferred to the master record-keeping sheet. We might see two envelopes like Figure 19.

It is clear, because of the purple and green stars, that Peter A. has completed all of the "A" and the "B" objectives. Opening the envelope, we note he has received tickets for objectives C-1, C-2, and C-3 indicating that they have been accomplished.

Bobby B.'s envelope and its purple and orange stars tells us that he has met all of the "A" and "C" objectives. Opening the envelope, we note that there are tickets for objectives B-1 and B-2.

On our master record-keeping sheet, we would log information for Peter A. and Bobby B. as on Figure 20.

The ticketing procedure may seem a bit cumbersome. There may be a temptation to avoid the necessity for developing large quantities of potentially messy small pieces of paper (the tickets). Further, it would be possible to avoid the ticketing altogether and have youngsters simply mark their progress on the master record-keeping sheet (See Figure 17). Why then is ticketing recommended?

Young children are motivated by objects they can handle. Tickets are something they can manipulate. Additionally, the necessity for students to maintain personal control of their tickets until the tickets are called for promotes responsibility. Finally, the procedure of requiring students to accumulate five tickets before a star is awarded is designed to help them develop an appreciation for longer term goals, moving them away from a desire for immediate gratification. Certainly, the ticketing procedure does involve a lot of teacher preparation, but we believe that some real instructional benefits will accrue to the students that simply would not be a part of a procedure if they were asked only to check off progress on a master record-keeping sheet.

With somewhat older students, we might consider the use of 3" x 5" cards and slip-pockets of the sort usually found in library books. One slip-pocket for each member of the class can be attached to a large piece of cardboard. Figure 21 illustrates one possibility for arranging the slip-pockets for each student.

Each 3" x 5" card can be prepared to include goals and instructional objectives. On completing an instructional objective the student can pull his or her card and bring it to the teacher to be initialed. A sample card might look something like Figure 22.

We can look at these cards from time to time and transfer information to our master record-keeping chart.

When we work with older students, particularly those in junior and senior high schools, we are confronted with a situation characterized by different classes of students using the same instructional space at various times throughout the school day. Because students of this age move from room to room, record-keeping forms which they keep themselves are most useful when they can be carried by the students. A simple procedure for devising a form of this type involves nothing more than generating a device that can be printed on pre-punched paper. Students can put these forms in two or three-ringed binders and carry them along with their books from class to class. An example of such a form is depicted on Figure 23.

For some more mature students, the approval section on the form may be disregarded and the students, themselves, permitted to fill in the date-completed section as a log of their personal progress. As teachers, we can collect these student-kept forms from time to time for the purpose of recording the data on our master charts.

Figure 20

Example of a Teacher's Class Record with Sample Data

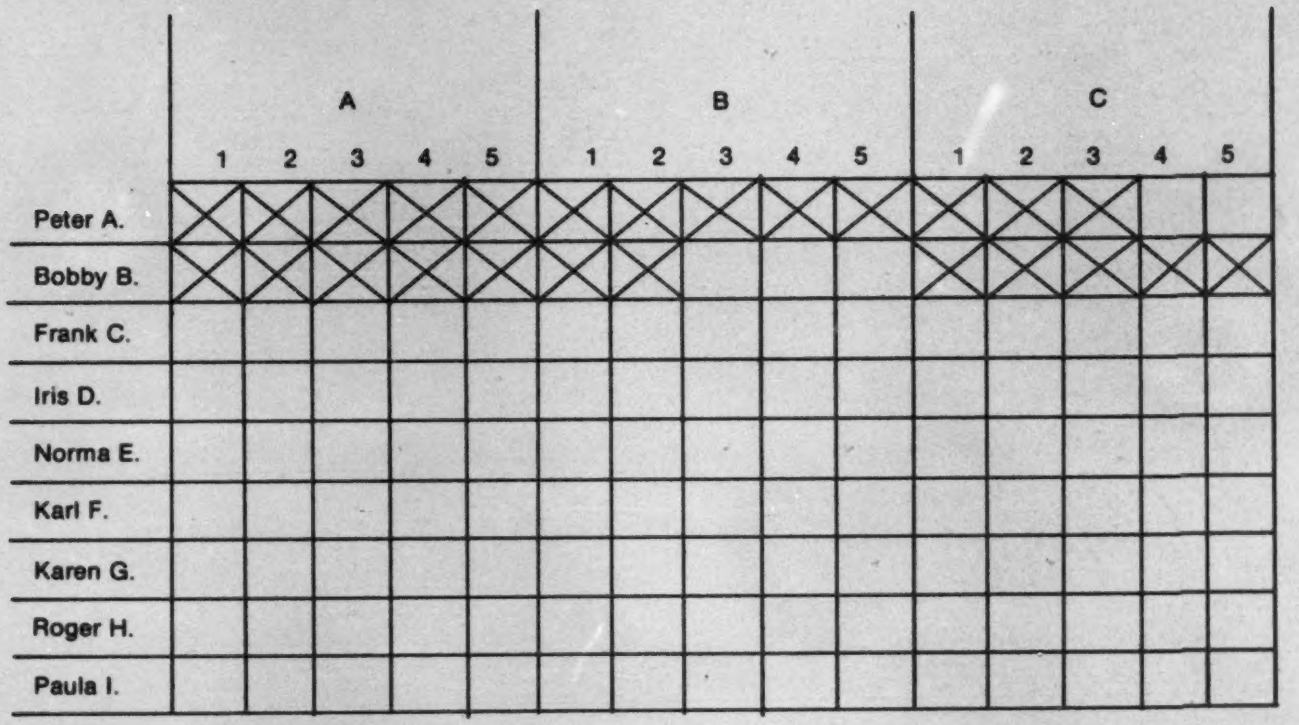


Figure 21

Example of a Holder for 3" x 5" Learner Progress Cards

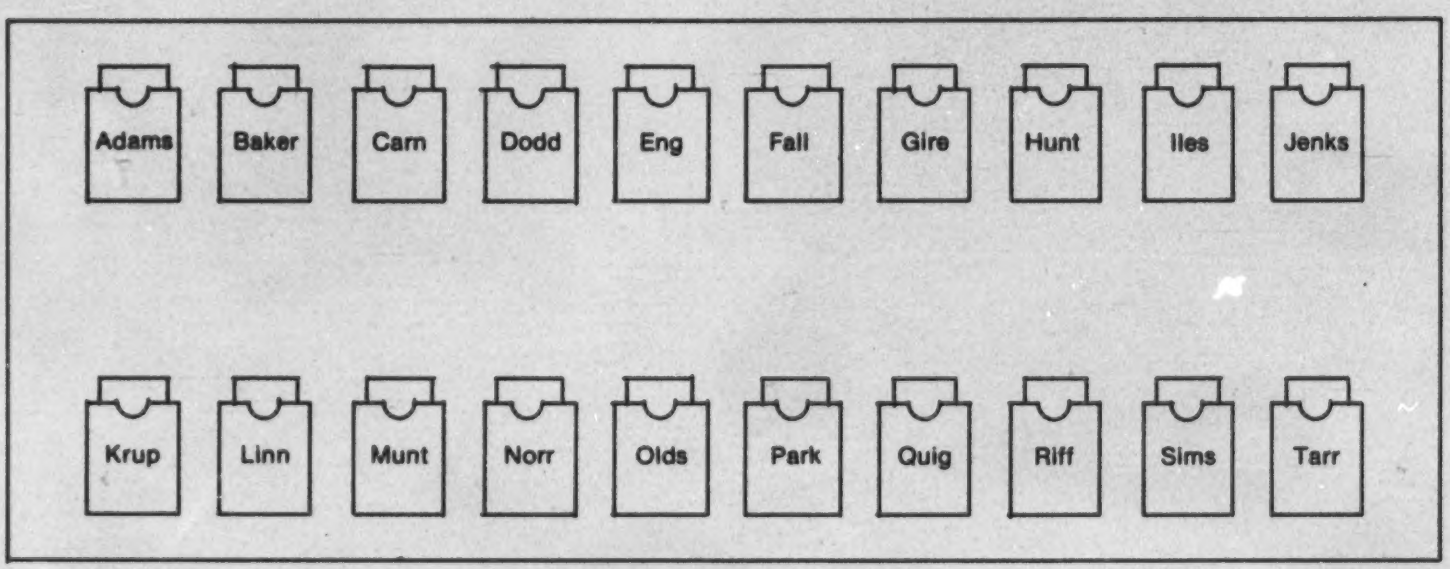


Figure 22

Example of a 3" x 5" Learner Progress Card

ADAMS			
GOAL	OBJECTIVES	APPROVAL	DATE
A	1	DJa	2/1
	2	DJa	2/4
	3	DJa	2/9
	4		
	5		
B	1	DJa	2/7
	2	DJa	2/15
	3	DJa	2/16
	4	DJa	2/19
	5	DJa	2/21
C	1		
	2		
	3	DJa	2/24
	4		
	5	DJa	2/26
	6	DJa	2/27

Figure 23

Progress Monitoring Form Maintained by Learner

	J. ADAMS			
	OBJECTIVES	TASKS	COMPLETED	APPROVAL
O	A	1	2/1	DJA
		2	2/4	DJA
	B	1	2/5	DJA
		2	2/9	DJA
		3	2/9	DJA
		4	2/12	DJA
O		5	2/13	DJA
	C	1		
		2	2/16	DJA
		3		
O	D	1		
		2	2/19	DJA
		3		
		4		

Models of learner-kept record forms introduced here represent only examples of what can be done. Each of us has unique informational needs. Likewise, our learners vary dramatically in terms of abilities to cope with self-kept records. We need to develop procedures that help us to get necessary information and that can be used with ease by students in our classes.

Security of Data

Regardless of the ages of the learners with whom we work, we need to provide for security of our data. The vast majority of students will neither interest themselves in nor disturb our records. However, when we work with large numbers of students, we likely will have a small number who, given the opportunity to do so, might deface or otherwise alter recorded information.

One solution to this problem involves keeping master class-data sheets in a room that is off limits to learners. Locks on files containing folders with progress records are recommended. As a rule of thumb, we should keep records out of public view except at those times when we ourselves or our learners, at our behest, are recording new information.

The nature of the specific responses we make to the problem is not nearly so important as is our recognition that the problem does exist and must be seriously addressed. We cannot allow the actions of a very small minority of irresponsible individuals to disrupt the record maintenance system. Such actions could undermine the credibility of our program in both the eyes of the large majority of our learners and of the building administration. Only through a secure record-keeping system can we be assured that rewards are a direct result of performance and not a result of an unauthorized manipulation of our data.

In Defense of Learner-Kept Records

Learner-kept records form a highly desirable component of a record-keeping system designed to support an individualized instructional program. Hopefully, the examples introduced here will be useful starting places as we attempt to assess our own needs and the backgrounds and competencies of our own learners. The ultimate form that the learner-kept record assumes is much less important than the benefits gained by the learners as they go through the process of keeping track of their own development and progress. As a promoter of individual responsibility, self-kept records make clear to students the consequences of their own actions. A systematic building toward that sort of personal accountability represents a contribution to personal development that merits promoting.

Conclusion

In this chapter guidelines for making costs-benefits decisions about record keeping procedures were described and steps for building toward learner participation in record keeping were introduced. Our hope has been to provide a practical framework for the design, operation, and monitoring of a record-keeping system that provides needed information, requires a relatively modest expenditure of teacher time, and promotes learner responsibility through active participation in the process.

We have provided examples which have varied in focus and in complexity. As a final thought, we would reiterate the theme that no standard record-keeping

system exists that can be applied successfully to all individualized instructional settings. Recognizing this reality, we must avoid asking a general question such as, Is this a good record-keeping system? The goodness of any system cannot be judged independent of the program and people it must serve.

Goodness for record keeping systems is contextual. A system is good or bad (or somewhere in between) only in terms of how it operates in a given instructional setting. What is required of us, then, is the courage to look not to external authority for a respectable set of procedures but to the unique demands of our own instructional situation. We must make the tough decision regarding what we need, what we desire, what we can give, and what will work.

Confident in our professional ability to identify the personal and general environmental characteristics of our own classrooms, we can develop our own good record-keeping systems. When we can accept the need to validate the worth of our record-keeping system by checking it against the demands of our own instructional context, we will develop an increasingly valuable and efficient system for collecting and using student progress information. Out of such a plan of action can develop programs, supported by responsible record-keeping systems, that make sensitivity to individual differences a day-to-day reality rather than a fuzzy theme of convention orators and faculty room bravado. As educators with a heavy emotional commitment to the nuts-and-bolts of education as well as to over-arching theory, we support efforts to develop well-defined operational procedures from prescriptions of a more general nature. Hopefully, the suggestions presented here represent a step in that direction.

BIBLIOGRAPHY

BIBLIOGRAPHY

Articles

Barber, D.L. "Punch Cards for Recording Student Data in an Individualized Program." *The Science Teacher* 42:42-44; 1974.

Fedo, M.W. "For the Record: Individualizing Learning." *American Education* 11:12-15; 1975.

Kay, B.W. "Monitoring Pupils' Performance." *Trends in Education* 2:11-18; 1975.

Keith, J.B., and Gluck, M.R. "Profile of Diagnostic Information Designed to Describe the Individual Learner." *Peabody Journal of Education* 52:33-42; 1974.

Mueller, L.W. "Let Them Check Themselves." *Instructor* 83:53-54; 1974.

Nitko, A.J., and Hsu, T.C. "Using Domain-Referenced Tests for Student Placement, Diagnosis, and Attainment in a System of Adaptive, Individualized Instruction." *Educational Technology* 14:48-54; 1974.

"Performance Printouts for Parents." *Nations Schools and Colleges* 1:31; 1974.

Pucel, D.J., and Copa, G.H. "Individualized Student Progress in Vocational Education Programs." *Educational Technology* 13:54-57; Oct. 1973.

Wilkins, P. "Record-Keeping Techniques for Use in Individualized Instruction." *Individualized Instruction: A Book of Readings.* (Edited by E.G. Talbert and L.E. Frase.) Columbus, Ohio: Charles E. Merrill Publishing Company, 1972. pp. 94-101.

Young, J.I., and Holder, L.E. "Keeping Track: A Recording System for Individualization." *Educational Technology* 12:31-33; August 1972.

Books

Bechtol, William M. *Individualization of Instruction and Keeping Your Sanity.* Chicago: Follett Publishing Company, 1973.

Blitz, Barbara. *The Open Classroom: Making it Work.* Boston: Allyn and Bacon, Inc., 1973.

Dell, Helen D. *Individualizing Instruction: Materials and Classroom Practices.* Chicago: Science Research Associates, Inc. 1972.

Shiman, David; Culver, Carmen; and Lieberman, Ann, editors. *Teachers on Individualization: The Way We Do It.* N.Y.: McGraw-Hill Book Company, 1974.

Stahl, Dona K., and Anzalone, Patricia M. *Individualized Teaching in Elementary Schools.* West Nyack, N.Y.: Parker Publishing Company, 1970.

Stephens, William S. *The Teacher's Guide to Open Education.* New York: Holt, Rinehart and Winston, 1974.

Smith, Lee L. *Teaching in a Non-Graded School.* West Nyack, N.Y.: Parker Publishing Company, 1970.

Suppes, Patrick, and Morningstar, Mona. *Computer-Assisted Instruction at Stanford, 1966-1968: Data, Models, and Evaluation of Arithmetic Programs.* New York: Academic Press, Inc., Publishers, 1972.

Monographs

California State Department of Education, Sacramento Office of Compensatory Education. "California Plan for the Education of Migrant Children–evaluation report, July 1, 1967 to June 30, 1968." 1968.

California State Polytechnic College, San Luis Obispo. "Work Experience Education: Research for Accountability." 1971.

Catholic Diocese of Pittsburgh, Pennsylvania. "Guidelines for a Continuous Progress Program." April 1970.

Morehead State University, Kentucky Appalachian Adult Education Center. "The Adult Learning Center." September 1972.

National Center for Educational Communication, Washington, D.C. "Individualized Instruction. PREP-16." September 1970.

Oregon Association for Supervision and Curriculum Development, Salem. "An Inventory of Reading Skills." 1972.

Oregón State Department of Education, Salem; Special Education Section. "Toward Competency: A Guide for Individualized Instruction." Student edition. March 1974.

Oregon State Department of Education, Salem; Special Education Section. "Toward Competency: A Guide for Individualized Instruction." Teacher edition.